

5

be any type of clean, lightweight mineral oil. The pressure range required to break the rupture disc 56 can be selected for the particular design. It is preferred to have the burst pressure range for the rupture disc 56 at a level lower than the lowest anticipated pressure required to break the shear pins 36.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made without departing from the spirit of the invention.

What is claimed is:

1. An apparatus for selective pressure build-up in a tubular, comprising:

a seat assembly comprising a seat supported by a movable body, said seat adapted to receive a member thereon to obstruct the tubular for pressure build-up;

said seat assembly movable between a first position, where the tubular may be obstructed by said member, and a second position, where flow past said seat and member can occur; and

a movement-regulating device operable on said seat assembly to selectively regulate the rate of movement from said first to said second position.

2. The apparatus of claim 1, wherein:

said regulating device prevents movement of said seat assembly until a predetermined range of applied pressure is exerted on said seat assembly.

3. The apparatus of claim 2, further comprising:

a housing defining a fluid chamber adjacent said seat assembly;

said seat assembly movably mounted to said housing such that movement of said seat assembly changes the volume of said fluid chamber.

4. The apparatus of claim 1, wherein:

at least one portion of said seat assembly is nonmetallic.

5. The apparatus of claim 4, wherein:

the entire seat assembly is nonmetallic.

6. An apparatus for selective pressure build-up in a tubular, comprising:

a seat assembly comprising a seat supported by a movable body, said seat adapted to receive a member thereon to obstruct the tubular for pressure build-up;

said seat assembly movable between a first position, where the tubular may be obstructed by said member, and a second position, where flow past said seat and member can occur; and

a movement-regulating device operable on said seat assembly to selectively regulate movement from said first to said second position;

said regulating device prevents movement of said seat assembly until a predetermined range of applied pressure is exerted on said seat assembly;

said seat assembly is made of at least a first and second component;

said first component releasably engaged to said second component;

said first component interacting with said regulating device for control of movement of said seat assembly;

whereupon failure of said first component to move sufficiently toward said second position, a build-up of pressure on said seat, above said predetermined range, separates said first and second components to reestablish flow in the tubular.

6

7. An apparatus for selective pressure build-up in a tubular, comprising:

a seat assembly comprising a seat supported by a movable body, said seat adapted to receive a member thereon to obstruct the tubular for pressure build-up;

said seat assembly movable between a first position, where the tubular may be obstructed by said member, and a second position, where flow past said seat and member can occur; and

a movement-regulating device operable on said seat assembly to selectively regulate movement from said first to said second position;

said regulating device prevents movement of said seat assembly until a predetermined range of applied pressure is exerted on said seat assembly;

a housing defining a fluid chamber adjacent said seat assembly;

said seat assembly movably mounted to said housing such that movement of said seat assembly changes the volume of said fluid chamber.

8. The apparatus of claim 7, wherein:

said removable barrier comprises a rupture disc.

9. The apparatus of claim 7, wherein:

said outlet comprises a flow restrictor to regulate fluid flow rate out of said fluid chamber to facilitate regulated movement of said seat assembly toward its said second position.

10. The apparatus of claim 9, wherein:

said housing comprises at least one lateral port and inlet; said seat assembly mounted in said inlet and in its said first position blocking said port;

whereupon pressure build-up to said predetermined range, said seat assembly creates fluid pressure in said fluid chamber to remove said removable barrier so that said seat assembly can move toward its said second position;

whereupon said port is opened to reestablish flow in the tubular.

11. The apparatus of claim 10, wherein:

said port has a shape which creates an open area which increases disproportionately with increasing translational movement of said seat assembly.

12. The apparatus of claim 9, wherein:

said seat assembly is made of at least a first and second component;

said first component releasably engaged to said second component;

said first component forming a part of said fluid chamber; whereupon failure of said first component to move sufficiently toward said second position to uncover said port, a build-up of pressure on said obstructed seat,

above said predetermined range, separates said first and second components to reestablish flow in the tubular.

13. The apparatus of claim 12, wherein:

said seat is mounted on a sleeve which defines said second component;

said first component comprises a piston with respect to said cavity, having a bore therethrough to allow a member to pass therethrough and sealingly land on said seat;

said piston connected to said sleeve by a breakable member for tandem movement until an applied pressure beyond said predetermined range is applied to said sleeve;

7

whereupon failure of said piston to move toward said second position, said sleeve separates from said piston as said breakable member breaks.

14. The apparatus of claim 13, wherein:

said breakable member comprises at least one shear pin. 5

15. An apparatus for selective pressure build-up in a tubular, comprising:

a housing;

a seat assembly mounted to said housing and defining a fluid chamber, said fluid chamber having an outlet and an obstructing member in said outlet; 10

said seat assembly further comprising a seat which, when obstructed and subjected to a predetermined range of pressure within the tubular, causes said seat assembly to, in turn, increase fluid pressure in said chamber to overcome said obstructing member, which allows movement of said seat assembly at a controlled rate from a first position, where the tubular is obstructed, to a second position, where flow past said seat assembly is established. 15 20

16. The apparatus of claim 15, wherein:

said obstructing member further comprises a flow restriction member in said outlet.

17. An apparatus for selective pressure build-up in a tubular, comprising: a housing; 25

a seat assembly mounted to said housing and defining a fluid chamber, said fluid chamber having an outlet and an obstructing member in said outlet;

said seat assembly further comprising a seat which, when obstructed and subjected to a predetermined range of pressure within the tubular, causes said seat assembly to, in turn, increase fluid pressure in said chamber to overcome said obstructing member, which allows movement of said seat assembly from a first position, where the tubular is obstructed, to a second position, where flow past said seat assembly is established; 30 35

said obstructing member comprises a rupture disc.

18. An apparatus for selective pressure build-up in a tubular, comprising: a housing; 40

a seat assembly mounted to said housing and defining a fluid chamber, said fluid chamber having an outlet and an obstructing member in said outlet;

said seat assembly further comprising a seat which, when obstructed and subjected to a predetermined range of pressure within the tubular, causes said seat assembly to, in turn, increase fluid pressure in said chamber to overcome said obstructing member, which allows movement of said seat assembly from a first position, where the tubular is obstructed, to a second position, where flow past said seat assembly is established; 45 50

said seat assembly comprises a piston having a bore therethrough and a sleeve releasably secured to said piston;

8

said piston forming a portion of said chamber, said bore allowing an obstructing member to pass through said piston and sealingly engage said seat;

whereupon if said piston fails to move sufficiently toward its said second position, application of pressure beyond said predetermined range of pressure causes said sleeve with said seat obstructed to break away from said piston to allow flow through the tubular.

19. An apparatus for selective pressure build-up in a tubular, comprising: a housing;

a seat assembly mounted to said housing and defining a fluid chamber, said fluid chamber having an outlet and an obstructing member in said outlet;

said seat assembly further comprising a seat which, when obstructed and subjected to a predetermined range of pressure within the tubular, causes said seat assembly to, in turn, increase fluid pressure in said chamber to overcome said obstructing member, which allows movement of said seat assembly from a first position, where the tubular is obstructed, to a second position, where flow past said seat assembly is established;

said obstructing member further comprises a flow restriction member in said outlet;

said obstructing member comprises a rupture disc;

said seat assembly comprises a piston having a bore therethrough and a sleeve releasably secured to said piston;

said piston forming a portion of said chamber, said bore allowing an obstructing member to pass through said piston and sealingly engage said seat;

whereupon if said piston fails to move sufficiently toward its said second position, application of pressure beyond said predetermined range of pressure causes said sleeve with said seat obstructed to break away from said piston to allow flow through the tubular.

20. An apparatus for selective pressure build-up in a tubular, comprising:

a seat assembly comprising a seat supported by a movable body, said seat adapted to receive a member thereon to obstruct the tubular for pressure build-up;

said seat assembly movable between a first position, where the tubular may be obstructed by said member, and a second position, where flow past said seat and member can occur; and

a movement-regulating device operable on said seat assembly to selectively regulate movement from said first to said second position;

the entire seat assembly is nonmetallic;

a substantial portion of said movement-regulating device is non-metallic.

\* \* \* \* \*

Add A17